

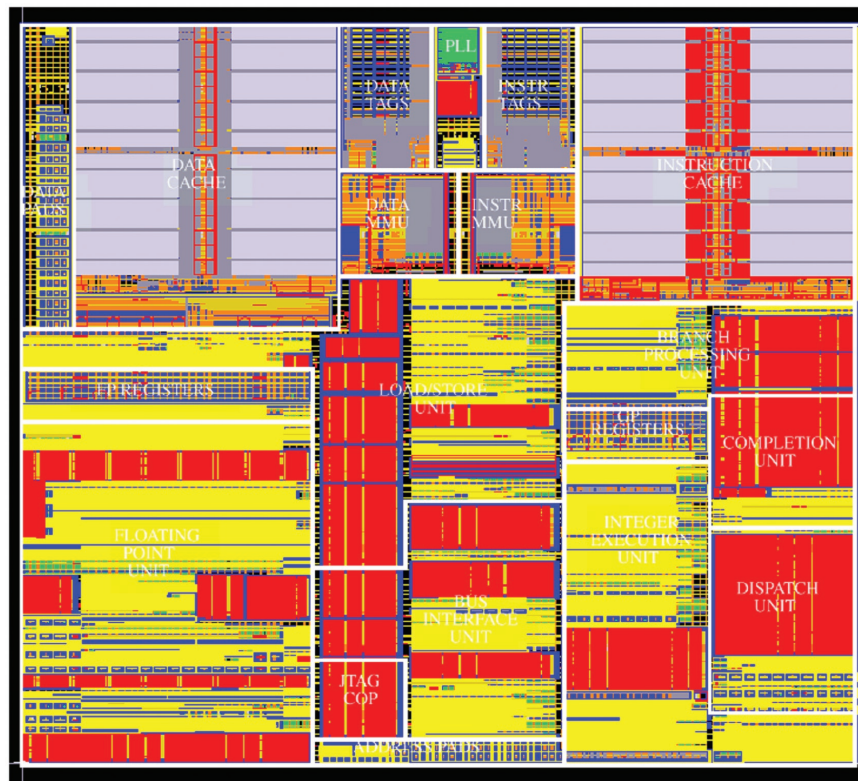


Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

POWERPC™ PROCESSORS FLY ON AIR FORCE MISSIONS



As spacecraft perform increasingly complex tasks, more on-board processing power is required. AFRL's latest generation of space processors, based on PowerPC, is becoming the architecture of choice for major Air Force and civil satellites.



Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

AFRL's Space Vehicles Directorate set out in 1998 to develop a space microprocessor with 10 times the throughput of current state-of-the-art spacecraft computers. During the next year, two projects based on PowerPC architectures were started. These projects were aimed at both the military market and expected commercial telecom applications. Based on the commercial expectations, both projects were heavily cost-shared by the development contractors chosen.

During the next 2 years, both projects achieved technical successes with the Honeywell RHPPC™ passing verification test suite for the Motorola 603e and the BAE Systems RAD750™ demonstrating equivalence to the IBM PowerPC 750. Both processors have been delivered to flight programs. These programs range from small AFRL experiments like XSS-11, to the Air Force's biggest operational programs like MILSATCOM and GPS-III, which will soon be flying in space.

Even though the commercial prospects have been postponed following the delay of systems like Teledesic and Iridium Next, both contractors continued their cost sharing and delivered prototype units within cost and schedule baselines.

Background

Outside of the protection offered by the earth's atmosphere and magnetic field, satellite electronics must be adapted to the space radiation environment using both circuit layout and special processing techniques. The size and complexity of these chips drove designers to use the most aggressive foundry facilities available. Designers also had to harden new structures such as phase lock loops that had never before been integrated into hardened chips. This project also pioneered the use of special circuit design techniques at a commercial foundry to achieve radiation tolerance for most space missions at reduced cost.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-VS-15)